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TWO INTERVIEWS WITH: ACADEMICIAN VIKTOR AMBARTSUMYAN AND DR. WERNHER VON BRAUN

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Two Interviews

Acad. Viktor Ambartsumyan

The mysteries of the distant galaxies.

The galactic nuclei and their role in explaining the processes of the universe.

The attention of astronomers is more and more attracted to the mystery-filled world of the galactic systems which exist far from the limits of our galaxy. In the Soviet Union, research in this field is especially carried on by the astronomers of the Burakans Observatory of the Academy of Science of the Armenian SSR. Journalist H. Linnik asked the Observatory's director, Viktor Ambartsumyan, president of the Academy of Sciences of the Armenian SSR to discuss for Contemporanul results obtained in the study of the galaxies.

It is difficult even to imagine the dimensions of the space of the Universe which is within the range of modern telescopes. The approximate range is between 5 and 6 billion light-years. Let us suppose that a map is made of the part of the Universe within the range of optical telescopes. Let us assume that the dimensions of this map are the same as those of the territory of the Soviet Union. It is about 10,000 kilometers from the Soviet Union's eastern frontier to its western frontier. What would be the area occupied by our solar system on the map? On a map of this size, our whole solar system--the Sun, the Earth, and the orbits of all the planets revolving around the Sun--would certainly occupy an area of one square micron, i.e., an area

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*Numbers given in the margin indicate the pagination in the original foreign text.

invisible to the naked eye. The outer galaxies would be arranged in the "remaining space," each one of them occupying an area equivalent to that of an ordinary building.

Making comparisons of the galaxies, astro-physicists have observed that they differ considerably in shape and appearance. Some have a spherical or slightly elliptical shape; others have excrescences forming a spiral, because of which they are called spiral galaxies; others are called "inexact." Astronomers have developed classification systems for the galaxies based on their various characteristics.

It has been established that dense formations, i.e., nuclei, exist in the center of many elliptical, spiral, and inexact galaxies. Observations made of the stellar systems have indicated that the nuclei play an enormous role in the life of the galaxies and in the processes taking place in them. It is known that each of the galaxies revolves around its center of gravity, which usually coincides with the nucleus. But the importance of the nucleus is not limited only to its indicating the geometrical center of gravity. Observations made of the galaxies have shown that some spiraled excrescences are discharged from the nucleus. It is possible that we incorrectly call them excrescences, but it appears to be true that they originate in the nucleus.

Moreover, discovery has recently been made of rectilinear streams leaving the nucleus. It is probable that in this case we have to do with a process of emitting matter from the nucleus. Sometimes denser portions can be observed inside these streams. Careful study of them has led us to the conclusion that they are indeed independent stellar systems, in fact galaxies themselves, but typical. This presupposes that the giant stellar systems "throw off" in turn smaller galaxies.

Dutch astronomers have determined that in our stellar system there occurs a similar process of "flowing out" of matter in the form of the separation of the matter of the spiral excrescences of the central region of the galaxy. From this, the conclusion can be drawn that the nuclei have, to a great extent, a generating function, i.e., that they are the very source of some "details" of the stellar systems, which "details" are the principal component parts of the systems.

The problem of the activity of galactic nuclei has likewise been approached in current research by means of radio-astronomy. The result is that the galaxies can be classified into two types. Some of them, the so-called ordinary galaxies, emit a relatively small amount of radio-active substances. But galaxies also exist with a greater power from this point of view. When we have to do with radio-galaxies and when we study them, we reach the conclusion that probably their nature is connected with the activity of the nuclei. Probably the nuclei give off emanations of large amounts of very rapid particles--electrons--and other particles that move at speeds approaching the speed of light. These particles give off emanations when they reach the magnetic fields of the interior and of the surrounding space of these galaxies.

Why is it that the galaxies of the Universe are not spread more or less evenly instead of being concentrated in greater or lesser densities? What is

the origin of the tendency toward density? The solution of these problems of galactic astronomy will bring us close to explaining many processes that take place in the Universe; it will raise humanity another step in the knowledge of distant worlds, their behavior and laws.

Dr. Wernher von Braun

Space--a scientific and industrial stimulus.

The Universe--an unlimited field for international scientific collaboration.

In his reply to a letter from our colleague, G. Ciubus, Dr. Wernher von Braun, the director of the George Marshall Space Flight Center in Huntsville, Alabama, belonging to the American National Agency for space research (NASA), gives his opinion regarding international cooperation in the field of space exploration and the prospects it opens for science and humanity:

"The exploration of cosmic space has become one of the most important factors in and stimuli for scientific and industrial progress. The daring penetration of man into hitherto inaccessible regions of the Universe is a very characteristic demonstration of the technical progress of our century. All mankind can be proud of these first incursions into the vastness of cosmic space, and we can look forward to numerous revealing discoveries that will enrich our store of knowledge and will contribute to the dynamic progress of our civilization."

To the question of whether man will soon reach the Moon, Dr. Wernher von Braun replies:

"The numerous experiments carried out successfully in cosmic space have shown that neither experiments with artificial satellites, space flights by man, nor experiments with interplanetary rockets have encountered technical difficulties that cannot be solved. . . .

We are confident that no obstacles exist which cannot be overcome for the achievement of this goal."

Dr. Wernher von Braun next discusses the role of science in mankind's future life and the prospects of multilateral collaboration among the scientists of the whole world.

"Science, in my opinion, will have greater and greater importance in mankind's life in the future. In order to be able to satisfy the growing needs of the world's population, we have to assure a continuous economic development of our countries, a development which in its turn is closely bound up with technical progress. If the progress of science and technology is under the control of men of good faith, who are morally responsible, we can be sure that its results will contribute to the prosperity of humanity.

I am convinced that in the coming years we shall see closer and closer international scientific collaboration; the premises of this collaboration even now rest upon the existence of a large number of international forums. Thus, for example, specialists of many countries will collaborate within the framework of the program of the international year of the calm sun (1964-1965) which, in turn, was preceded by the international geophysical year (1957-1958) when great success was achieved in collecting new data in various parts of the globe through the measurements made by the first artificial satellites.

The knowledge of our planet and of its physical surroundings was enriched by that occasion.

I am hopeful that, by successfully carrying out these projects which involve an even closer international collaboration, we shall open the way to undertaking broader and more complex activities together. The vastness of the Universe doubtless offers unlimited possibilities in this direction."

The Congress of the "P.E.N. Club"

The article refers to the 32nd International Congress of the P.E.N. Club (poets, essayists, and novelists) that opened in Oslo at the end of June, 1964 in the presence of King Olaf. Reference is made to the history of the organization, including its exclusion of Nazi and Fascist delegates in the past. The present activities of the Club are discussed and mention is made that the 1965 meeting will be in Yugoslavia and the 1966 meeting in New York. The article closes with references to the early history of Oslo and to the relations between Norway and the Byzantine Empire and the Kiev state.

Signed: Victor Eftimiu

Every 7 Days

Important events

This is a group of brief paragraphs referring to various items of interest, mainly cultural. One item concerns a plan of French scientists to launch satellites and balloons for meteorological studies on an international scale. The plan is named "Eole" and was presented to the session of world meteorological organizations.

After San Francisco

The article reports the nomination of Goldwater as Republican candidate and discusses the convention of the Republican party and the candidate's background and prospects, which are viewed unfavorably.

Signed: Obs.

The Rumanian presence abroad in Geneva

A Rumanian film has been shown in a Geneva theater and ceramics from Rumania exhibited in a Geneva museum.

Photograph at upper left of page is of Jean Jaures (assassinated July 31, 1914) whose achievements are briefly described.

Photograph in center of page is of Angelica Arenal, wife of Mexican painter David Alfaro Siqueiros. She has campaigned for his release from a Mexican prison.